

Claims

1. A measurement system integrity checking system, the checking system comprising:
 - integrity checking logic independent from measurement system logic;
 - 5 an input that receives measurement system determination signals from the measurement system logic; and
 - sensors, coupled to the integrity checking logic for verifying proper operation of the measurement system.
- 10 2. The integrity checking system of claim 1 wherein the sensors comprise photo-eyes for positioning along a conveyor having packs to be weighed by the measurement system.
3. The integrity checking system of claim 2 wherein a first sensor comprises a
15 photo-eye that detects pack skew prior to weighing.
4. The integrity checking system of claim 3 wherein the first sensor further detects packs too closely spaced for proper weighing.
- 20 5. The integrity checking system of claim 2 wherein a second sensor detects whether a pack is properly traveling down a reject path on the conveyor.
6. The integrity checking system of claim 5 wherein the second sensor further detects backups on the reject path on the conveyor.
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7. The integrity checking system of claim 2 wherein a third sensor detects whether a pack is traveling down an accept path on the conveyor.
8. The integrity checking system of claim 7 wherein the third sensor detects whether
30 the accept path on the conveyor is blocked.

9. The integrity checking system of claim 1 wherein the independent integrity checking logic is operable to generate multiple messages regarding the integrity of the measurement system.

5 10. The integrity checking system of claim 1 wherein the independent integrity checking logic is operable to shut down the conveyor.

11. An integrity checking system having independent integrity checking, the system comprising:

10 a conveyor belt for conveying packs through the system;

a scale associated with the conveyor belt that weighs packs while they move on the conveyor belt;

checkweigher logic coupled to the scale for determining whether the pack within a desired weight range;

15 a pack reject device controlled by the checkweigher logic that rejects packs outside the desired weight range;

independent integrity checking logic; and

multiple sensors coupled to the checkweigher system and independent therefore, providing information to the independent integrity checking logic regarding movement of the packs through the checkweigher system.

12. The checkweigher system of claim 11 wherein the sensors comprise photo-eyes positioned along the conveyor.

25 13. The checkweigher system of claim 11 wherein a first sensor comprises a photo-eye that detects pack skew prior to weighing.

14. The checkweigher system of claim 13 wherein the first sensor further detects packs too closely spaced for proper weighing.

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15. The checkweigher system of claim 11 wherein a second sensor detects whether a pack is properly traveling down a reject path.
16. The checkweigher system of claim 15 wherein the second sensor further detects
5 backups on the reject path.
17. The checkweigher system of claim 11 wherein a third sensor detects whether a pack is traveling down an accept path.
- 10 18. The checkweigher system of claim 17 wherein the third sensor detects whether the accept path is blocked.
19. The checkweigher system of claim 11 wherein a fourth sensor detects whether the reject device has sufficient air pressure.
- 15 20. The checkweigher system of claim 11 wherein the independent integrity checking logic is operable to generate multiple messages regarding the integrity of the integrity checking system.
- 20 21. The checkweigher system of claim 11 wherein the independent integrity checking logic is operable to shut down the conveyor belt.
22. A method of checking the integrity of a checkweigher, the method comprising:
independently sensing a pack on a conveyor line of the checkweigher;
25 determining if the pack is skewed based on a length of time that the pack is sensed;
determining if consecutive packs are too closely spaced to obtain a proper weight based on a length of time between sensing the consecutive packs; and
providing a message independent of the checkweigher representative of such
30 determinations.

23. The method of claim 22 and further comprising providing a reject signal to a reject device if either determination is positive.

24. The method of claim 23 and further comprising independently detecting if a pack
5 was properly rejected.

25. The method of claim 22 and further comprising independently detecting if a properly rejected pack is blocking a reject path.

10 26. The method of claim 22 and further comprising independently detecting if a pack was properly accepted.

27. A method of checking the integrity of a checkweigher that measures the weight of packs while moving on a conveyor belt, the method using logic independent from the
15 checkweigher comprising:

receiving accept and reject signals from the checkweigher based on the checkweigher's measurements of the packs;

independently determining if the packs were properly positioned on the conveyor for weighing;

20 receiving sensor signals independent of the checkweigher indicative of whether packs are properly accepted or rejected in accordance with the accept and reject signals; and

generating messages regarding the integrity of the checkweigher system based on a comparison of the sensor signals and the accept and reject signals received from the
25 checkweigher.

28. The method of claim 27 and further comprising generating a reject signal if it is determined that a pack is not properly positioned on the conveyor.

30 29. The method of claim 28 and further comprising logging rejected packs.

30. The method of claim 29 and further comprising generating a message if ten packs in a row were rejected.

31. The method of claim 29 and further comprising generating a message if ten of the
5 last thirty packs were rejected.

32. The method of claim 27 and further comprising detecting if packs are backed up in various positions on the conveyor.

10 33. The method of claim 27 wherein the messages are selected from a group consisting of warnings, fatal errors and nonfatal faults.

34. The method of claim 27 wherein the messages are representative of faults selected from the list consisting of pack skew, insufficient gap, checkweigher response fault,
15 checkweigher locked on, checkweigher locked off, air pressure fault, ten rejected in a row, ten of thirty rejected, pack not rejected, pack not accepted, photo-eye failure, line backup, and reject bin overflow.

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